

### Responses to Stress

#### Wolf's Law

"Bone elements place or displace themselves in the direction of the functional forces"

- bone tissue is alive and reacts to mechanical stress
- increase in functional force on the bone- increase in bone strength
- increase in functional force- increase in bone mass
- bone density: function of magnitude and direction of the mechanical stresses

multidirectional, weight bearing

sports

Increase Bone Matrix = DENSITY

Sep 5-10:53 AM

### Hypertrophy vs Atrophy

- Hypertrophy: increase in bone mass
  - (a) in response to regular physical activity
  - (b) function of the intensity of the activity
  - (c) transfer effects

osteoblasts ↑

- Atrophy:
  - (a) calcium loss
  - (b) decrease of bone mass, strength, and bone resistance
  - (c) increase in the likelihood of injury to bone tissue

osteoclasts ↑

-aging

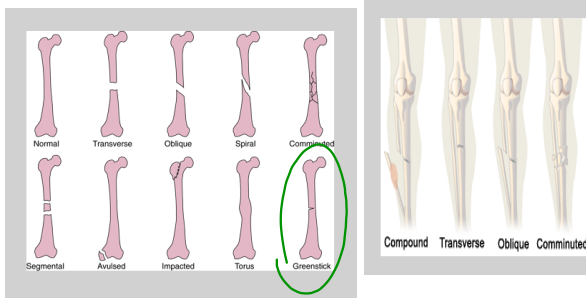
-sedentary lifestyle

Sep 5-11:00 AM

### Disorders and Diseases of the Skeletal System

#### Fractures

- a break in the bone
- a) simple- enclosed beneath the skin
- b) compound- broken end of a bone tears skin
- c) comminuted fracture - bone is crushed (pressure)
- d) green stick fracture- bone broken on one side



Sep 5-11:05 AM



Sep 22-6:17 PM



Sep 22-6:18 PM

### Repair

- blood clots stop bleeding ( aspirin stops clotting agents \* never before surgery)
- a callus (cartilage) begins to form around the ends
- osteoblasts from the periosteum begin to form new bone

### Dislocations

- bone shifted out of position
- ligaments may be stretched or torn
- i.e. shoulder in hockey- check along the boards

### Sprains

- stretching of the ligaments
- i.e. spine, ankle, knee

### Strain


- pulled or torn muscle tissue
- excessive stretching and or tearing of the muscle belly

Sep 5-11:10 AM

Osteoporosis

- a disease in which the spaces in the bone get larger
- related to lack of calcium
- prevent by creating high bone density in childhood

weakened bone matrix



Arthritis

- joint inflammation

Rheumatoid Arthritis is an auto-immune response which trick the body into destroying the synovial membranes

Osteoarthritis is the most common form. It is caused by the wear and tear of joint tissues.

It effects 85% of the American Population

Sep 5-11:17 AM

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